

**REMARKS**

By the above amendments, claim 1 is revised and new claims 24-26 are added to place this application in condition for allowance. Currently, claims 1-4, 6, 7 and 18, 19, and 21-26 are before the Examiner for consideration on their merits.

In review, claim 1 has been revised to further define the first heating step as being 20 minutes or more. Support for this revision may be found in the specification on page 13, lines 20-25. Claim 24 is added to further and collectively define the lubricating powder and claim 25 further defines the resin. Claim 26 merely combines the limitations of these two claims. The effect of these materials is shown in the Examples of the specification.

The revision to claim 1 now requires the Examiner to consider whether a *prima facie* case of obviousness is established for the process of claim 1, wherein two heating steps are recited and the initial heating step is conducted at 20 minutes or more.

In the rejection, a key to the Examiner's position is that the heating step of Tsuru being in the range of 180-270 °C encompasses the steps of claim 1, wherein a first heating step is conducted at 70-140 °C followed by a second heating step at a temperature of 150 to 380 °C. In taking this stance, the Examiner considers the preheating of the material to the target temperature of Tsuru, e.g., 180 °C, to be the same as the claimed first heating step of heating the material between 70 and 140 °C.

In light of the revision to claim 1, the Examiner must not only maintain the stance that the heat up of the material of Tsuru is the same as the claimed first heating step, but also contend that the ramping up of the temperature of the material in Tsuru to get to the target temperature of between 150 and 300 °C would also take 20 minutes or more.

Applicant submits that Tsuru cannot be interpreted to teach the two heating steps as now recited in claim 1. In order for such an interpretation to be made, the Examiner must assert that increase in temperature of the coated pin or box of Tsuru that occurs as a result of getting the material to the target temperature of 150-300 °C would result in a heating in the range of 70-140 °C for twenty minutes or more. This twenty minute duration would be in addition to the desired heating time associated with the disclosed heating step of Tsuru.

This interpretation is not supported when considering the times of heating employed by Tsuru. Tsuru teaches that once the box or pin is coated, a heat treatment step is conducted to form the solid lubricating coating layer, see col. 4, line 50-52. The heating is performed in a temperature range of 150 to 300 °C, and preferably 180 to 270 °C. Examples 1 and 10 disclose a heating time of 20 minutes at 180 °C. Examples 3, 11, and 17 use a heating time of 30 minutes at 200 °C with Examples 4, 12, and 18 using a heating time of 30 minutes at 250 °C. Example 5 uses a heating time and temperature of 30 minutes at 240 °C

and Examples 6, 13, and 14 use 25 minutes at 260 °C. The heating parameters for Examples 7, 8, and 15 were 20 minutes at 270 °C. The heating parameter for Example 16 was 25 minutes at 250 °C. From this, it can be ascertained that the heat treating time used to bake the coating on the pin or box of Tsuru, e.g., the 20-30 minutes mentioned above, is analogous to the heating time of the first heating step of claim 1 of 20 minutes or more.

Therefore, for the Examiner to continue to assert that the first heating step of claim 1 is the same as the preheating of the pin or box of Tsuru, the Examiner must contend that the preheating time used in Tsuru for the temperature range of 70-140 °C would be nearly the same or nearly the same time as the actual heat treating time at the target temperature range of 150-300 °C. Put another way, the Examiner must interpret Tsuru to teach that it takes 20 minutes or more to go from 70 to 140 °C as part of the preheating of the material to the target temperature of 150 to 300 °C. Moreover, since the ramping up of Tsuru includes time at temperatures outside the claimed range of 70-140 °C, the preheating time to get to the target of 150 to 300 °C would likely be longer than the target heating time that is exemplified as 20-30 minutes.

Considering these factors, one of skill in the art would not interpret the ramping up time to the target temperature of Tsuru to be as long as the actual heating time or that the material of Tsuru would spend twenty

minutes in the range of 70 to 140 °C. Drawing this conclusion has no rational basis in Tsuru when considering that the total heating time for Tsuru is in the range of 20 to 30 minutes.

Taking into account the practicalities of heat treating operations, the energy costs associated with heat treating a material would mandate that the box or pin are heated no longer than necessary. Since Tsuru's aim is to process the pin or box at a temperature of 150-300 °C for a select period of time, one of skill in the art would not say that the pin or box would be heated at a lower temperature for approximately the same amount of time. When faced with the requirement that claim 1 now requires a specific time at temperature that is outside the heating range of Tsuru, an interpretation that the ramping up of the material to the target temperature is the same as the claimed first drying step lacks the required rational basis from within the confines of Tsuru that is required to support a rejection.

In fact, Tsuru's aim of a higher temperature heat treatment for a select period of time would teach away from subjecting the box or pin to a similar heating time at a lower temperature. To say that the Tsuru's process can be interpreted to include a drawn out low temperature heating step of 20 minutes or more between 70 and 140 °C is speculative at best and the rejection cannot be maintained from this standpoint. This initial step is described in the specification as a drying step and no such step is even hinted at in Tsuru as a prelude to the actual heating or baking step.

Going back to the particulars of the rejection, since there is no explicit description of the claimed first heating step, the Examiner must either say that the step is inherently found in Tsuru or it would be obvious to practice such a step. Applicants have argued above that there is no basis to conclude that a heating step of more than 20 minutes at 70-140 °C would inherently occur in Tsuru's process. Therefore, this aspect of claim 1 cannot be considered to be inherent in the Tsuru process.

In addition, there is no basis in the prior art to support a contention that one could modify Tsuru with such a step. To do so would be the hindsight reconstruction of the prior art using Applicants' invention as a teaching template. Since this practice is forbidden in patent law, any such rejection would be reversed on appeal. In light of the above, it cannot be said that Tsuru teaches the claimed set of heating steps and a *prima facie* case of anticipation or obviousness is not established in this regard.

While the Examiner makes reference to the use of multi-heating steps in the prior art, this alone does not provide a reason why one of skill in the art would engage in a low temperature and 20 minute or more heating step as a prelude to the heating step of Tsuru. To allege obviousness based only on the fact that multi-step heating steps are known in the metallurgical heat treating field is the exercise of hindsight and lacks the required reasoning noted in *KSR* to support a rejection under 35 U.S.C. § 103(a).

Since Tsuru does not establish a *prima facie* case of obviousness against claim 1, Applicants do not have to rely on the unexpected results associated with the invention.

Nevertheless, Applicants wish to incorporate the previously-made arguments that the two step process employed by the invention produces a solid lubricant coating having a hardness of 70-140 (HRm) and an adhesive strength of at least 500 N/m so that a marked improvement in the resistance to galling can be achieved. These results are completely unexpected given Tsuru and they substantiate the patentability of the claims in rebuttal of any allegation of obviousness.

In response to the Examiner's contention that the comparative evidence is not commensurate in scope with the claims, Applicants first submit that since a *prima facie* case of obviousness is not established against newly amended claim 1, there is no need to rely on the comparative evidence for patentability. Tsuru's failure to teach the invention of claim 1 alone is grounds for allowing this claim.

Nevertheless, the reasoning to dismiss the comparative evidence is improper in Applicants' view. In the rejection, the Examiner notes that claim 1 only calls for a resin and a broad listing of lubricating powders whereas the examples of the specification used only a particular lubricant and two types of resins.

As the Examiner correctly notes, the evidence in support of the patentability of the invention must be commensurate in scope with the claimed invention. Before delving into the question of whether the evidence matches the scope of the claims, it is important to understand the evidence in the context of the invention.

In the comments in the rejection, the Examiner takes issue with the comparative evidence as though it was necessary to exemplify a number of different resins and lubricating powders in order to rebut the *prima facie* case of obviousness. However, it is well established that evidence directed to species may be used to support the patentability of a genus under certain circumstance, see MPEP 716.02(1). It is respectfully submitted that the instant situation falls under this category and that the comparative evidence is sufficient to rebut the *prima facie* case of obviousness alleged to be present by the Examiner.

Taking a closer look at the invention as defined in claim 1 and the comparative evidence, the invention is the use of the two step heating process, not a particular resin or lubricating composition. Applicants' comparative evidence as shown in Table 3 deals with changing the heating conditions to determine the effect on the hardness and adhesive strength. Taking Comparative No. 2 and Example No. 2, for the same material, providing the low temperature treatment results in improved adhesion. This is a direct comparison of the effect of heating conditions for two exemplary

lubricants and resins. Similarly, heating outside the claimed ranges, see Comparative No. 4, results in poor hardness and adhesion. With this comparison in mind, the question to be answered is whether the comparative evidence would allow one of skill in the art to extend its probative value to support the nonobviousness of a method that expands the resin and lubricating compound over that used in the comparison.

Applicants submit that since the focus of the invention is on the heating steps, not the particular resin or lubricant compound and that different resins have been tested, one of skill in the art would expect the inventive sequence of heating steps to provide the same results to other coated joints with other known lubricants and resins. Therefore, the comparative evidence in the context of the invention and the discovery of the improvements when practicing the drying and baking step does show unexpected benefits, which can be relied upon to substantiate the unobviousness of claim 1.

Therefore and assuming that the Examiner would continue to assert that Tsuru establishes a *prima facie* case of obviousness, the evidence is commensurate in scope with the claims before the Examiner and it effectively rebuts any allegation of obviousness.

Even if the Examiner were to insist that the evidence is not commensurate in scope with the claims, the claims that list a more narrow range of resins, i.e., claims 23, 25, and 26, when coupled with the already

narrow list of lubricants in claim 1 make the comparative evidence commensurate in scope with these claims. Thus, these claims, at the least, are patentably distinguishable over Tsuru.

To summarize and in light of the changes to claim 1 and arguments made above, it is submitted that either the prior art does not establish a *prima facie* case of anticipation or obviousness or the discovery of improvements in galling resistance when coating oil well pipes is one that is unexpected and sufficient to rebut any contention of obviousness. Further, the evidence is commensurate in scope with the claims and it supports the arguments regarding rebuttal of the allegation of obviousness.

Accordingly, the Examiner is respectfully requested to examine this application in light of this response and pass all pending claims onto issuance.

If an interview with Applicant's attorney would expedite allowance of this application, the Examiner is invited to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated April 13, 2007.

Again, reconsideration and allowance of this application is respectfully requested.

Applicant petitions for a three-month extension of time. A check covering the petition fee of \$1,050.00 is attached.

However, please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,  
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